

CLAIMS:

1. An apparatus for aligning an instrument during a surgical procedure, said apparatus comprising a guide adapted for guiding an instrument during said surgical procedure; and alignment means coupled to said guide for aligning said guide along a translational path and first and second rotational paths.

2. The apparatus of claim 1, wherein said alignment means includes a first assembly adapted for positioning said guide along a translational path in controlled increments upon operation of said first assembly; a second assembly adapted for positioning said guide along a first rotational path in controlled increments upon operation of said second assembly; and a third assembly adapted for positioning said guide along a second rotational path in controlled increments upon operation of said third assembly.

3. The apparatus of claim 2, wherein said first and second assemblies are coupled to a housing.

4. The apparatus of claim 3, wherein said first assembly comprises a yoke, a pair of spaced apart rods slideably coupling said yoke to said housing, and a threaded rod rotatably coupled to said yoke and threadingly coupled to said housing, whereby rotation of said rod causes translation of said guide relative to said yoke.

5. The apparatus of claim 4, wherein said yoke includes a pair of spaced apart arms and at least one rod transversely attached therebetween.

6. The apparatus of claim 5, further including a fixation plate adapted to be fixed to a patient's bone during the surgical procedure, said fixation plate pivotably coupled to said rod.

7. The apparatus of claim 3, wherein said second assembly comprises a plate having a first portion coupled to said guide and a second portion rotatably coupled to a worm

within said housing, whereby rotation of said worm causes rotation of said plate thereby causing rotation of said guide.

8. The apparatus of claim 7, further including coupling means for releasably coupling said first portion of said second assembly to said guide.

9. The apparatus of claim 7, wherein said second portion of said plate comprises a wall having an arcuate shaped opening, and at least one pin received within said housing and having a portion captured within said opening.

10. The apparatus of claim 9, wherein said wall includes a plurality of teeth meshed with said worm.

11. The apparatus of claim 2, wherein said third assembly comprises an internally threaded sleeve rotatably coupled to said guide, a pair of spaced apart rods slideably coupling a cross-member to said guide, and a threaded rod threadingly coupled at one end thereof within said sleeve and attached to said cross-member at another end thereof, whereby rotation of said sleeve causes translation of said cross-member thereby causing rotation of said guide.

12. The apparatus of claim 11, wherein said guide includes a shelf having an opening, said sleeve rotational coupled to said shelf within said opening.

13. The apparatus of claim 1, wherein said guide includes a slotted opening adapted to receive the surgical instrument.

14. An apparatus for aligning an instrument during an arthroplastic surgical procedure, said apparatus comprising a guide adapted for guiding an instrument during said arthroplastic procedure; a first assembly coupled to said guide adapted for positioning said guide along a translational path in controlled increments upon operation of said first assembly; a second assembly coupled to said guide adapted for positioning said guide along a first rotational path in controlled increments upon operation of said second assembly;

and a third assembly coupled to said guide adapted for positioning said instrument guide along a second rotational path in controlled increments upon operation of said third assembly, whereby said guide is maintained in fixed position along said translational path and said first and second rotational paths upon termination of the operation of said first, second and third assemblies.

15. The apparatus of claim 14, wherein said first and second assemblies are coupled to a housing.

16. The apparatus of claim 15, wherein said first assembly comprises a yoke, a pair of spaced apart rods slideably coupling said yoke to said housing, and a threaded rod rotatably coupled to said yoke and threadingly coupled to said housing, whereby rotation of said rod causes translation of said guide relative to said yoke.

17. The apparatus of claim 16, wherein said yoke includes a pair of spaced apart arms and at least one rod transversely attached therebetween.

18. The apparatus of claim 17, further including a fixation plate adapted to be fixed to a patient's bone during the surgical procedure, said fixation plate pivotably coupled to said rod.

19. The apparatus of claim 15, wherein said second assembly comprises a plate having a first portion coupled to said guide and a second portion rotatably coupled to a worm within said housing, whereby rotation of said worm causes rotation of said plate thereby causing rotation of said guide.

20. The apparatus of claim 19, further including coupling means for releasably coupling said first portion of said second assembly to said guide.

21. The apparatus of claim 19, wherein said second portion of said plate comprises a wall having an arcuate shaped opening, and at least one pin received within said housing and having a portion captured within said opening.

22. The apparatus of claim 21, wherein said wall includes a plurality of teeth meshed with said worm.

23. The apparatus of claim 14, wherein said third assembly comprises an internally threaded sleeve rotatably coupled to said guide, a pair of spaced apart rods slideably coupling a cross-member to said guide, and a threaded rod threadingly coupled at one end thereof within said sleeve and attached to said cross-member at another end thereof, whereby rotation of said sleeve causes translation of said cross-member thereby causing rotation of said guide.

24. The apparatus of claim 23, wherein said guide includes a shelf having an opening, said sleeve rotational coupled to said shelf within said opening.

25. The apparatus of claim 14, wherein said guide includes a slotted opening adapted to receive the surgical instrument.

26. An apparatus for aligning a surgical cutting instrument during a surgical procedure along a translational path and first and second rotational paths, said apparatus comprising an instrument guide having an opening adapted for receiving said instrument; and an alignment guide having first, second and third assemblies coupled to said instrument guide for aligning said opening in controlled increments along said translational path and said first and second rotational paths; wherein said first, second and third assemblies each include a rotational component adapted for manipulating said instrument guide along said translational path and said first and second rotational paths upon rotation of said rotational component.

27. The apparatus of claim 26, wherein said first and second assemblies are coupled to a housing.

28. The apparatus of claim 27, wherein said first assembly comprises a yoke, a pair of spaced apart rods slideably coupling said yoke to said housing, and a threaded

rod rotatably coupled to said yoke and threadingly coupled to said housing, whereby rotation of said rod causes translation of said guide relative to said yoke.

29. The apparatus of claim 28, wherein said yoke includes a pair of spaced apart arms and at least one rod transversely attached therebetween.

30. The apparatus of claim 29, further including a fixation plate adapted to be fixed to a patient's bone during the surgical procedure, said fixation plate pivotably coupled to said rod.

31. The apparatus of claim 27, wherein said second assembly comprises a plate having a first portion coupled to said guide and a second portion rotatably coupled to a worm within said housing, whereby rotation of said worm causes rotation of said plate thereby causing rotation of said guide.

32. The apparatus of claim 31, further including coupling means for releasably coupling said first portion of said second assembly to said guide.

33. The apparatus of claim 31, wherein said second portion of said plate comprises a wall having an arcuate shaped opening, and at least one pin received within said housing and having a portion captured within said opening.

34. The apparatus of claim 33, wherein said wall includes a plurality of teeth meshed with said worm.

35. The apparatus of claim 26, wherein said third assembly comprises an internally threaded sleeve rotatably coupled to said guide, a pair of spaced apart rods slideably coupling a cross-member to said guide, and a threaded rod threadingly coupled at one end thereof within said sleeve and attached to said cross-member at another end thereof, whereby rotation of said sleeve causes translation of said cross-member thereby causing rotation of said guide.

36. The apparatus of claim 35, wherein said guide includes a shelf having an opening, said sleeve rotationally coupled to said shelf within said opening.

37. An apparatus for aligning an instrument during a surgical procedure, said apparatus comprising an instrument guide adapted for guiding said instrument during said surgical procedure; a first assembly adapted for aligning said instrument guide along a first rotational path, said first assembly including an internally threaded sleeve rotationally coupled to said instrument guide, a first pair of spaced apart rods slideably coupling a cross-member to said instrument guide, and a threaded first rod rotationally coupled at one end thereof to said sleeve and attached at another end thereof to said cross-member, whereby rotation of said sleeve effects translation of said cross-member thereby effecting manipulation of said instrument guide along said first rotational path; a second assembly adapted for aligning said instrument guide along a second rotational path, said second assembly including a housing supporting a rotatable plate including a first portion having a first gear and a second portion coupled to said instrument guide, and a rotatable second gear coupled to said first gear, whereby rotation of said second gear effects rotation of said plate thereby effecting manipulation of said instrument guide along said second rotational path; and a third assembly adapted for aligning said guide instrument along a translational path, said third assembly including a yoke, a second pair of spaced apart rods slideably coupling said yoke to said housing, and a second threaded rod rotatably coupled to said yoke and threadingly coupled to said housing, whereby rotation of said second threaded rod effects translation of said instrument guide relative to said yoke.

38. The apparatus of claim 37, wherein said guide includes a slotted opening adapted to receive the instrument.

39. The apparatus of claim 37, wherein said yoke includes a pair of spaced apart arms and at least one rod transversely attached therebetween.

40. The apparatus of claim 39, further including a fixation plate adapted to be fixed to a patient's bone during the surgical procedure, said fixation plate pivotably coupled to said rod.

41. The apparatus of claim 37, wherein said guide includes a shelf having an opening, said sleeve rotational coupled to said shelf within said opening.

42. An apparatus for aligning a cutting instrument during a surgical procedure, said apparatus comprising a guide having an elongated slot adapted to receive a cutting instrument for resecting a patient's bone during a surgical procedure; a housing; a translational assembly coupled to said housing adapted for effecting distal-proximal adjustment of said guide; a first rotational assembly coupled to said housing adapted for effecting varus-valgus adjustment of said guide, said first rotational assembly adapted to be releasably coupled to said guide; and a second rotational assembly coupled to said guide adapted for effecting flexion-extension adjustment of said guide.

43. The apparatus of claim 42, wherein said translational assembly and said first and second rotational assemblies are constructed to align said guide in controlled increments.

44. The apparatus of claim 42, wherein each of said assemblies include a member adapted for causing adjustment of said guide upon rotation of said member.

45. The apparatus of claim 44, wherein said member in said translational assembly compromises a threaded rod rotatably coupled to a yoke and threadingly coupled to said housing, said yoke supported by a pair of spaced apart rods

slideably coupling said yoke to said housing, whereby rotation of said rod causes translation of said guide.

46. The apparatus of claim 44, wherein said member in said first rotational assembly comprises a worm within said housing, said first rotational assembly further including a plate having a first portion coupled to said guide and a second portion rotatably coupled to said worm within said housing, whereby rotation of said worm causes rotation of said plate thereby causing rotation of said guide.

47. The apparatus of claim 46, wherein said second portion of said plate comprises a wall having an arcuate shaped opening, and at least one pin received within said housing and having a portion captured within said opening.

48. The apparatus of claim 44, wherein said member in said second rotational assembly comprises a threaded rod, said second rotational assembly further including an internally threaded sleeve rotatably coupled to said guide, a pair of spaced apart rods slideably coupling a cross-member to said guide, and said threaded rod threadingly coupled at one end thereof within said sleeve and attached to said cross-member at another end thereof, whereby rotation of said sleeve causes translation of said cross-member thereby causing rotation of said guide.

49. The apparatus of claim 48, wherein said guide includes a shelf having an opening, said sleeve rotationally coupled to said shelf within said opening.

50. A method for aligning an instrument during a surgical procedure using an alignment apparatus comprising an instrument guide adapted for guiding said instrument during said surgical procedure; a first assembly adapted for aligning said instrument guide along a first rotational path, said first assembly including an internally threaded sleeve rotationally coupled to said instrument guide, a first pair of spaced apart rods slideably coupling a cross-member to said



instrument guide, and a threaded first rod rotationally coupled at one end thereof to said sleeve and attached at another end thereof to said cross-member; a second assembly adapted for aligning said instrument guide along a second rotational path, said second assembly including a housing supporting a rotatable plate including a first portion having a first gear and a second portion coupled to said instrument guide, and a rotatable second gear coupled to said first gear; and a third assembly adapted for aligning said guide instrument along a translational path, said third assembly including a yoke, a second pair of spaced apart rods slideably coupling said yoke to said housing, and a second threaded rod rotatably coupled to said yoke and threadingly coupled to said housing; said method comprising rotating said sleeve to effect translation of said cross-member and manipulation of said instrument guide along said first rotational path, rotating said second gear to effect rotation of said plate and manipulation of said instrument guide along said second rotational path, and rotating said second threaded rod to effect translation of said instrument guide relative to said yoke.

51. The method of claim 50, further including attaching a fixation plate to a patient's bone, and pivotably coupling said fixation plate to said yoke.